No. 780,279. PATENTED JAN. 17, 1905.

W. E. GARDNER.

METHOD OF CLEANSING OIL WELLS.

APPLICATION FILED OCT. 10, 1904.

Fig. 1.

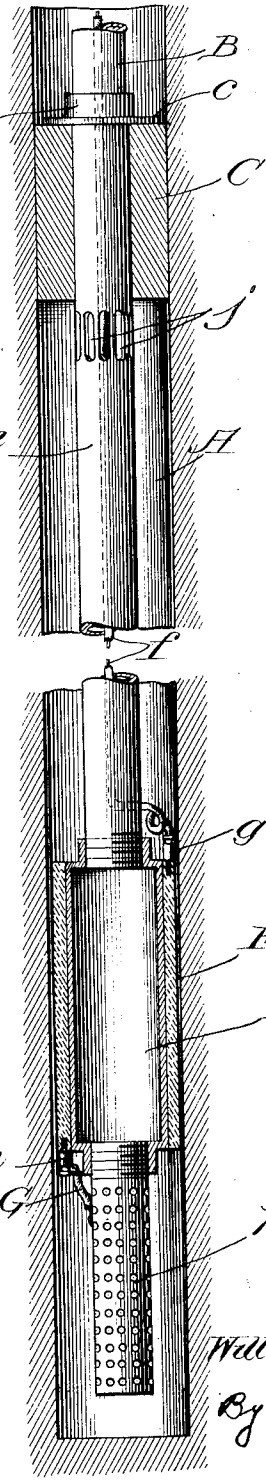


Fig. 2.

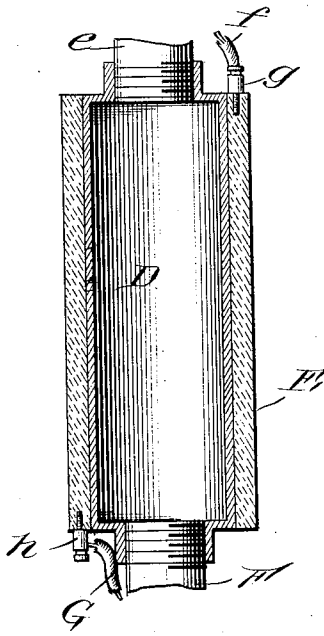
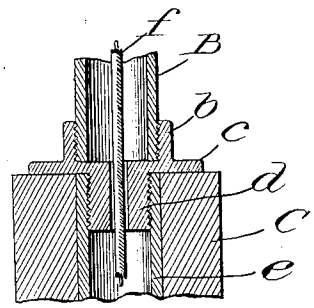


Fig. 3.



Witnesses:
Otto Wenwich
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Inventor
William Edward Gardner.
By Frank D. Thomasson
Atty.

No. 780,279. Patented January 17, 1905.

UNITED STATES PATENT OFFICE.

WILLIAM EDWARD GARDNER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-EIGHTH TO FRANK D. THOMPSON, OF CHICAGO, ILLINOIS.

METHOD OF CLEANSING OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 780,279, dated January 17, 1905.

Application filed October 10, 1904. Serial No. 227,851.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD GARDNER, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Cleansing Oil-Wells, of which the following is a full, clear, and exact specification.

The object of my invention is to soften and clean the walls of the bore of the oil-bearing strata of an oil-well, so as to remove the solidified paraffin or other base of the crude oil which dams up and chokes the passages and channels through which the crude oil naturally flows into the well. This I accomplish by a process which heats and causes the ebullition of the fluid that accumulates in the well and confines and causes the steam generated thereby to expand against and eat its way into the surrounding accumulations of obstructing material in the bore of the oil-bearing strata of the well, and thus removes the same, substantially as hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal vertical section of the lower oil-bearing strata of an oil-well, showing my improvements, partly in side elevation and partly in section, applied thereto. Fig. 2 is a longitudinal vertical section of the heater used in connection therewith. Fig. 3 is a vertical central section of the portion of the plug or well-packing and coupling used in connection therewith.

Referring to the drawings, A represents the bore of a well the walls of which may, if desired, be lined by suitable pipes or tubes down as far as the oil-bearing stata of the well. My invention necessitates a metal pipe B of smaller diameter to be inserted down into the well, that has its lower end tapped into a suitable head *b*, which latter is provided with circumferential flanges *c* and with a plug *d*, extending downward centrally therefrom, that is tapped into the upper end of a section of pipe *e*, extending down into the oil-bearing strata of the well, as will hereinafter more fully appear. The bore of the well above the head *b* is separated from the portion of the same below said head by a packing C, which surrounds the upper end of the section of pipe *e* and fills the space between the outer circumference of the same and the walls of the well sufficiently tight to prevent the escape of the steam and hot fluid generated by the apparatus of my invention from the space below said packing.

The pipe *e* extends down into the oil-bearing strata of the well, preferably to a point near the bottom of the same, where it is tapped into the upper reduced end of a hollow chamber D, constituting the boiling-chamber of the heater used in connection with my invention and provides a support for the circumferential casing E of the resistance material surrounding the same. The lower end of chamber D is likewise reduced, preferably in the same manner as its upper end, and has tapped into the same a perforated intake-pipe F, the lower end of which is preferably closed.

The plug *d* of the head *b* has a small vertical opening therein for the downward passage therethrough of an insulated positive wire *f* of an electric circuit whose lower end at a point just above the heater extends laterally out through a suitable opening in the side of the pipe *e* and is connected to a suitable binding-post *g*, tapped into the upper end of the resistance material of the heater at a suitable point. The lower edge of the resistance-casing E has a binding-post *h* tapped into it, and an insulated negative wire G connects said binding-post with the perforated intake F. The metal pipe of my invention forms the negative leg of the electric circuit.

In operation when the current is turned on the resistance-casing E becomes highly heated, and the fluid which accumulates in the oil-bearing strata of the well and fills the chamber D soon becomes sufficiently heated for it to flow upward through the pipe *e* to a point just below the packing C, where it passes out of the elongated perforations *j* in the sides of the pipe into the space between the same and the walls of the well, where, becoming cooler, it gravitates downward to the bottom of the well and is then drawn into the intake and caused to circulate the same as before. When this fluid becomes sufficiently heated to gen-

erate steam, the circulation and agitation of the fluid and steam in the oil-bearing strata are very great and soften and loosen the paraffin or other base of the oil and work their way into the surrounding oil-bearing earth and thoroughly cleanse the passages and channels leading therefrom into the well to such an extent as to cause the well to flow again in as great or greater quantity as originally.

The apparatus hereinbefore described for accomplishing my improved process is made the subject-matter of a separate application for Letters Patent of the United States filed by me December 8, 1904, Serial No. 235,985.

What I claim as new is—

1. The method of cleansing oil-wells which consists of first closing the bore of the well at a suitable point adjacent to the upper end of the oil-bearing strata and then subjecting the walls of the bore thereof in the oil-bearing strata to the action of heated fluid.

2. The method of cleansing oil-wells which consists of first closing the bore of the well at a suitable point adjacent to the upper end of the oil-bearing strata and then subjecting the walls of the bore thereof in the oil-bearing strata to the action of heated fluid and steam.

3. The method of cleansing oil-wells which consists of first closing the bore of the well at a suitable point adjacent to the upper end of the oil-bearing strata and then subjecting the walls of the bore thereof in the oil-bearing strata to the action of a body of constantly-moving heated fluid.

4. The method of cleansing oil-wells which consists of first closing the bore of the well at a suitable point adjacent to the upper end of the oil-bearing strata and then subjecting the bore thereof in the oil-bearing strata to the action of a body of constantly-moving heated fluid the central portion of which moves upward and the outer portion downward.

In testimony whereof I have hereunto set my hand this 5th day of October, A. D. 1904.

WILLIAM EDWARD GARDNER.

Witnesses:
FRANK D. THOMASON,
E. K. LUNDY.

Correction in Letters Patent No. 780,279.

It is hereby certified that the name of the assignee in Letters Patent No. 780,279, granted January 17, 1905, upon the application of William Edward Gardner, of Pittsburg, Pennsylvania, for an improvement in "Methods of Cleansing Oil-Wells," was erroneously written and printed "Frank D. Thompson," whereas the said name should have been written and printed *Frank D. Thomason;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2d day of May, A. D. 1905.

[SEAL.]

F. I. ALLEN,
Commissioner of Patents.